



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/810,419	03/26/2004	Lahir Shaik Adam	TI-36390	8933
23494	7590	06/22/2005		
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			EXAMINER DANG, PHUC T	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 06/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/810,419

Applicant(s)

ADAM ET AL.

Examiner

PHUC T. DANG

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on election filed June 1, 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 18-25 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-17 is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Art Unit: 2818

DETAILED ACTION

Restriction/election

1. Applicant's election without traverse of Group I (claims 1-17) filed on June 1, 2005, drawn to a method for fabricating a tri-gate semiconductor device and withdrawn Group II (claims 18-25).

Applicants have the right to file a divisional application covering the subject matter of the non-elected claims.

Specification

2. The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 4-6, and 8 are rejected under 35 U.S.C. 102 (b) as being anticipated by Chang et al., hereinafter "Chang" (U.S. Patent No. 6,204,159 B1).

Art Unit: 2818

Regarding claims 1, Chang discloses a method for forming a NAND gate flash memory device comprising:

forming a high voltage gate dielectric layer (48, Fig. 7) over a semiconductor substrate (30, Fig. 7);

implanting a low dose of nitrogen (col. 8, lines 34-35) into the semiconductor substrate (30, Fig. 7) in a low voltage core region (34, Fig. 8); and

forming a low voltage core gate dielectric layer (58, Fig. 7) over the low voltage core region (34, Fig. 8), including forming an intermediate core gate dielectric layer (40, Figs. 6-11) over an intermediate core region (46, Fig. 11).

Regarding claims 4-5, Chang discloses the thickness of the gate dielectric layers are applied in the process [col. 5, lines 49-52 and col. 8, lines 55+].

Regarding claim 6, Chang discloses forming the low voltage core gate dielectric layer (58, Fig. 7) and the intermediate core dielectric layer (40, Fig. 7) is conducted in the presence of an environment of nitrogen [col. 8, lines 27-38].

Regarding claim 8, Chang discloses forming a first gate over the high voltage gate dielectric layer, forming a second gate over the low voltage core gate dielectric layer and forming a third gate over the intermediate core dielectric layer [Fig. 12].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior

Art Unit: 2818

art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2-3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang in view of An et al., hereinafter "An" (U.S. Patent No. 6,165,849).

Chang discloses all the features of the claimed invention as discussed above, but does not disclose the implanting of the low dose ranges of nitrogen into the substrate.

An, however, discloses the implanting of the low dose ranges of nitrogen into the substrate [col. 3, lines 18-29].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the above discussed teaching of Chang as taught by An for a purpose of improving the reliability in the processing.

Allowable Subject Matter

5. Claims 10-17 would be allowed.

The following is a statement of reason for the indication of allowable subject matter:

Claims 10-17 are considered allowable since the prior art of record and the considered pertinent to the applicant's disclosure does not teach or suggest the claimed invention having a step of forming interconnects extending through dielectric layers located over first, second, and third transistor gates to interconnect the first, second and third transistor gates to form an operative tri-gate integrated circuit as cited in claim 10.

Art Unit: 2818

Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.

None of the prior art made of record does not disclose a step of forming the second gate includes forming the second gate such that a concentration of nitrogen within the second gate is substantially uniform through the second gate.

Conclusion

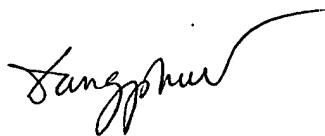
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuc T. Dang whose telephone number is (571) 272-1776. The examiner can normally be reached on 8:00 am-5:00 pm.

7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571) 272-1787. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and After Final communications.

8. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Phuc T. Dang

PD



Primary Examiner

Art Unit 2818